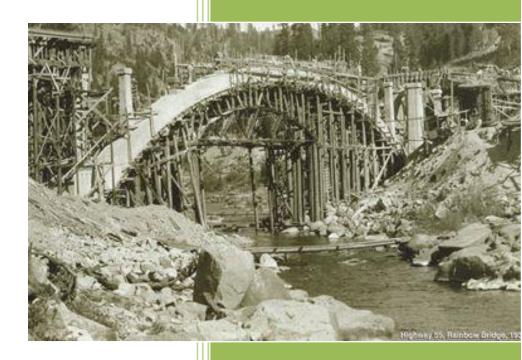# 2017

HSIP Standard Planning Process

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Contents

Overview

Highway safety is one of the primary objectives of the Idaho Transportation Department (ITD). The Highway Safety Improvement Program (HSIP) is comprised of projects proposed by the ITD Districts and the Local Highway Technical Assistance Council (LHTAC). They are selected based upon highway safety data and align with the Strategic Highway Safety Plan (SHSP) fulfilling the requirements defined by the Fixing America's Surface Transportation Act (FAST). The SHSP outlines strategies to significantly reduce traffic fatalities and serious injuries through projects specified in the HSIP, providing a standard way to evaluate progress on a regular basis. The purpose of this document is to reduce the risk of inconsistent HSIP execution.

Individual projects are required to correct or improve highway safety in an identified highway safety corridor, specific location or to address a highway safety problem utilizing a systematic approach. A systematic approach is the application of a known proven countermeasure to improve an expanded area such as a corridor, multiple intersections, or a defined area. ITD and the LHTAC follow similar processes. The ITD Districts and the LHTAC are responsible to scope and develop safety projects for insertion into the HSIP. Projects are combined in the Project Scheduling System (PSS) and the Office of Transportation Investment System (OTIS) for review and evaluation. ITD district projects are analyzed with the Transportation Economic Development Impact System (TREDIS). The projects with the highest return are funded.

The foundation of consistency within the HSIP process is completing a project charter for each project. The charter contains information that can be used to consistently compare projects against each other and provide details needed for analysis in TREDIS. Another important aspect of the HSIP program is specified justification which is necessary for the Federal Highway Administration – Idaho (FHWA-ID) to assess the funding eligibility of the proposed projects. The project must be focused on reduction of fatalities and serious injuries.

Corridor Planning (ITD)

The purpose of corridor planning is to address future transportation needs in a comprehensive and more importantly measurable manner. By measuring the results of multiple projects within a given corridor the effectiveness of the overall projects can be consistently compared holistically. Corridor planning also facilitates joint planning with local governments, other agencies, and other stakeholders within a corridor rather than individual locations. Each corridor plan includes:

- Available financial resources
- Overview of conditions
- Overview of 20 year projections
- Expected travel demand
- Summary of public process

The corridor plan must be based upon a clearly defined and recognized need presented in the purpose and need statement. The plan should also be consistent with existing plans and documents. This consistency should include local comprehensive plans within the corridor area. Each plan may have a different character, but the basic format will be consistent among the districts to facilitate comparison and evaluation by ITD.

SHSP (ITD & LHTAC)

The SHSP provides the framework to address statewide data driven roadway safety by systematically implementing effective strategies and statistically validated countermeasures. An important component in successfully reducing fatalities and serious injuries is following a proactive evaluation process. The key to effective evaluation is to follow a consistent methodology in choosing projects so they can be objectively measured. There are five principles driving the SHSP:

- Data driven decisions
- Culture change countering the belief that traffic deaths are just a way of life
- Commitment to the long range view
- Partnerships with state and local agencies, stakeholders, and the general public
- Evaluation

HSIP Planning (ITD)

HSIP Planning is primarily based upon the corridors that have been defined for each district by the Office of Highway Safety (OHS). The purpose of corridor planning is to address future transportation needs in a comprehensive and more importantly measurable manner. By measuring the results of multiple projects within a given corridor the effectiveness of the overall projects can be consistently compared holistically. Corridor planning also facilitates joint planning with local governments, other agencies, and other stakeholders within a corridor rather than only individual locations.

Identify Projects (ITD)

Each district uses different tools to evaluate potential projects, as well as using TAMS, IPLAN, WebCars, and other tools available to the districts. As IPLAN matures there will be useful tools that will make sense for each district to use, particularly as it already houses some tools such as the HSCA maps. IPLAN will also make it easier to track all the information necessary to evaluate the eligibility of each project from the FHWA-ID perspective. Once the projects have been identified as being appropriate for a district they need to be evaluated against the SHSP and funding sources.

HSIP Eligible? (ITD)

An eligible project is defined in MAP-21 and continued in FAST as "any identified highway safety project to correct or improve a hazardous road location or address a highway safety problem" that is in alignment with Idaho's SHSP. A list of eligible projects is available in Idaho's *Highway Safety Improvement Program (HSIP) Project Justification Guide*. These include:

- Intersection safety improvements
- Corridor safety improvements
- New pavement marking
- New sign installation
- New crash attenuators

There are some types of projects that are not eligible for HSIP funds, such as enforcement programs, public information campaigns. Some projects that may be FAST eligible are not considered eligible on the State Highway System by ITD policy as they support the operation of the highway system instead of increasing safety, such as:

- Brooming
- Replacement pavement markings
- Sign upgrades

- Corridor planning studies
- ADA ramps
- ITS projects
- RWIS installation and maintenance costs

While working with these area guidelines, if there are questions they should be addressed with the Transportation Systems Division.

Create Project Charter (ITD & LHTAC)

Any proposed HSIP project must have a completed Project Charter that meets FAST eligibility requirements to be considered for funding. An acceptable charter must include a Project Objective Statement (POS) and a Scope of Work clearly identified to support HSIP funds. It also must include a timeline with realistic start and finish dates.

Most importantly the charter must include an appropriate HSIP justification that addresses the following:

1. How is the project safety-driven?
   - Base Answers upon the Strategic Highway Safety Plan.
   - Site statistics and results such as the basis of crash experience, crash potential, crash rate, or other data-supported means.
2. How does the project align with and help implement the strategies found in the Strategic Higheay Safety Plan?
   - Pinpoint safety problems either through a site analysis or systematic approach;
   - Identify counter measures to address those problems;
   - Priortize projects for implementation; and
   - Evaluate projects to determine their effectiveness
3. How does the project eliminate death and serious injury?
   - Address identified safety issues within a highway wsafety corridor or a spot location such as an intersection or High Accident Location (HAL) or does it incorporate a system-wide approach such as rumble strips.
   - Each district has a corridor map outlining safety corridors (also known as the Highway Safety Corridor Analysis (HSCA)). Make sure to review these maps for pertinent system-wide safety corridor analysis.
   - Provide a predicted crash reduction value in the form of either a crash modification factor or a predicted crash reduction number.

Enter Into PSS and OTIS (ITD & LHTAC)

All project evaluations are based upon the information that has been entered in PSS and the Office of Transportation Information System (OTIS). The FHWA-ID has access to the PSS system and uses it to review and determine HSIP eligibility for each project. The Transportation Systems Division uses OTIS to track more extensive information and pulls projects from the Transportation System's Early Development (ED) Program for analysis.

Meet Funding Caps? (ITD)

In addition to meeting all of the requirements defined by FAST they also must meet the ITD funding caps outlined in the program update package. The determination of funding cap eligibility is made by the ED program.

Prioritize Projects (ITD)

The projects are prioritized by the Economics Office and Transportation Systems using the TREDIS process. TREDIS calculates benefits in safety and mobility as a result of a project, including economic value that can be realized related to transportation and the mobility it affords to the citizens and businesses of the state of Idaho.

Implement Projects (ITD)

Once the projects have been approved and prioritized by the Transportation Systems they are designed and constructed within each district using existing project management best practices.

Identify Projects (ITD)

The specific steps outlined in the first section are expanded here. The main resources to consider for this process are the SHSP, HAL, HSCA, and the Corridor Plans.

Review Corridor Plan (ITD)

The ultimate goal of ITD is to have a corridor plan completed for each defined corridor within each district. These plans contain a long range overview of the entire corridor based upon an ongoing dialogue among professional staff, stakeholders, and citizens at large. The prioritized potential projects from these plans will have the most impact on increasing the safety of the State Highway System.

These plans require a significant investment of resources and are not completed for all corridors. If a corridor plan doesn't exist the information gathered during the HSIP process can be used to determine which projects have the highest priority, as well as contribute to building a corridor plan.

Review District Needs Lists (ITD)

Each district has been keeping independent needs lists. They are in various data stores, such as Excel spreadsheets, Word documents, and independent Access databases. If a specific needs list doesn't exist for the district the information necessary to build a list of projects to evaluate can be found in TAMS or IPLAN.

Review Data (ITD)

TAMS contains tools and information regarding current ITD assets throughout the state. These assets include:

- Construction history
- Traffic data
- Visual survey data
- Pavement profiler van data
- Signs

TAMS allow the creation of scenarios based upon the data to evaluate the potential results of investments in specific assets. ITD also maintains video logs of geographical locations that document the Idaho State Highway System. The records are identified by date, route designation, travel direction, and milepost numbers.

Review Crash Data (ITD)

The OHS maintains a crash analysis reporting system called WebCARS. This application is a central repository that is updated by several state agencies as they investigate crashes throughout the State of Idaho. These records can be organized by many attributes, including but not limited to the following:

- Location
- Number of fatalities
- Number of serious injuries
- Units involved
- Weather conditions
- Roadway conditions
- Lighting conditions

Since the fundamental purpose of HSIP funding is to lower fatalities and serious injuries these are the most important data points for the initial evaluation.

Crash Related to Roadway? (ITD)

The next important aspect of HSIP funding is that the causes of crashes to address are caused by safety issues with the roadway. Human behaviorally caused crashes, such as drowsiness or alcohol impairment or texting, need to be evaluated to determine if they should be removed from the data analysis. In some situations, the countermeasure proposed could reduce the severity of the crash, thus justifying a reason to retain the crash.

Using the Human Factors Guidelines, the physical features and operating environment are analyzed from the standpoint of driver capabilities and limitations. Understanding how the driver interprets and reacts to specific features of the roadway and operating environments is essential to accurately identifying crash causality and defining the appropriate countermeasures related to the roadway.

Determine High Priority Segments (ITD)

The segment data from the HSCA application is reviewed by the district. The data are updated to match the current definitions and also updated with the current HAL locations. The crash records within each segment are aggregated to produce a fatality and serious injury count.

Prioritize High Priority Segments (ITD)

The data aggregated within the district while determining initial high priority segments is normalized by calculating safety scores using Excel. These scores are calculated based upon the VMT, fatalities, and serious injuries within comparable ICAP categories. The updated segment data and safety health scores are updated to GIS to create statewide and district maps showing segment priorities. Transportation Systems makes the final prioritization decisions across the districts.

Identify Crash Patterns (ITD)

Using WebCARS data, the crash patterns should be organized into categories, which are based upon direction of travel, such as opposing, same direction, or angle. The other category is crash events, such as rear end, sideswipe, head-on, or single unit. Grouping the crash types and causes supports objective comparisons within the segments.

Identify Physical Features of Roadway (ITD)

Identifying the physical features of the roadway includes aggregating information from a variety of sources, including TAMS, GIS, Google Earth, Video log, and physical inspections. The documentation should include roadway delineation, signing, roadside hazards, and access. The more detailed this description of the roadway conditions the more appropriate and effective countermeasures can be defined for a given project.

Calculate Needs Scores (ITD)

Using the information from the previous calculations another calculation is used to identify specific locations within the high priority segments in the district where density and severity of the crashes is the highest. This calculation is used to evaluate one-tenth mile segments within the longer high priority segment. The results of this calculation do not determine the priority of a given project, but provide another objective variable used to consider the value of a given project. Transportation Systems makes the calculation of needs scores comparing the districts.

Identify Countermeasures (ITD)

The HSM contains the available countermeasures that can address the issues identified during the corridor evaluations. The countermeasures contained in the HSM have already been validated to predict a specific reduction in fatality and serious injury when implemented on a highway. These validations are

based upon years of analysis on highways across the United States by the FHWA. Using these countermeasures ensures that all of the ITD projects can be measured accurately.

Develop CMF Scores (ITD)

The Crash Modification Factors are used to adjust the estimate of average crash frequency for the effect of the specific features of a given project. These factors reflect the characteristics that determine what a future crash frequency would be. They also represent the types of safety improvements for which a potential crash reduction project can be estimated. The FHWA maintains a website with a clearinghouse of all the CMFs included in the HSM. The CMFs are rated based upon their statistical reliability and sample size. It is best to use the highest rated CMF available. The district is to combine CMF for each project and submit into PSS. A worksheet was created to help with a safety based benefit cost analysis. A link to the worksheet can be found in the list of resources at the end of this document. It is the B/C Worksheet.

Send Information to Transportation Systems (ITD)

The information developed in the HSIP process is entered into OTIS and PSS. Transportation Systems uses the information entered into these systems where it will be evaluated using the TREDIS application.

Tribal Communications

 Tribes are notified when the Idaho Transportation Investment Program (ITIP) is released in draft form for 30 days of public comment. The ITIP has a funding source column which shows which projects are HSIP funded.

Implement Project List (ITD)

Once the projects have been prioritized and approved they will be implemented and managed using OTIS and PSS.

LHSIP Application Process (LHTAC)

The Local Highway Technical Assistance Council works with ITD to address the safety of the Idaho local roads. LHTAC also uses the HSIP funding from the FHWA. These funds are dedicated for use on local safety projects. LHTAC provides a recommended project list. The projects are reviewed and approved by the FHWA using PSS.

Determine Funding Split (ITD & LHTAC)

Through FY19 LHTAC received approximately $3.9M for Local HSIP projects. For funding FY20 and beyond, ITD and LHTAC will review the data together to determine the appropriate funding split based on the total number of Fatal (K) plus Serious Injury (A) crashes. The percentage of K+A Crashes on local roads will equal the funding split between ITD and LHTAC. The current approved funding split for FY20 and FY21 is 50%.

Receive Data from OHS (LHTAC)

OHS delivers crash data to LHTAC. LHTAC provides this information to the locals and general public on the LHTAC website in a GIS format.

Determine Eligible Local Jurisdiction (LHTAC)

LHTAC will evaluate the total number of K+A crashes for all local jurisdictions. LHTAC will determine how many jurisdictions per ITD District to invite to apply for Local HSIP funding.

Local/LHTAC Analyze Possible Projects (LHTAC)

LHTAC will work with the local jurisdictions to determine projects, counter measures and project costs. Locals can determine projects with their own staff, request LHTAC assistance, or contract with a Consulting Engineer. First time application of pavement markings, and sign upgrades (increased size, new signs, etc.) are allowed through the LHSIP process.

Local Submit Application (LHTAC)

Locals will use the FHWA Countermeasures as well as the Highway Safety Manual to submit applications including ITD forms 1150, and 2435.

Rank on Benefit Cost Ratio (LHTAC)

LHTAC staff will evaluate each application. The applications will be checked for accuracy in reporting crashes and the Crash Modification Factor. The applications will be ranked based on the Cost Benefit Ratio.

Submit to ITD for ITIP (LHTAC)

The results of the information collected during the LHTAC evaluation of their sponsored projects is sent to ITD for inclusion into the HSIP program.

Tribal Notifications

After a submitted application is approved by LHTAC for inclusion in the LHSIP, the project limits are analyzed. If it is identified as being on the reservation, or on aboriginal territory, the tribe is notified of the project intent. A Programmatic Agreement has been implemented between ITD and both the Nez Perce and Coeur D'Alene tribes for specific project types. Coordination with these entitites continues throughout the project development and construction of these projects.

Implement Projects (LHTAC)

Once the projects have been approved and prioritized, design work moves forward. Most projects will be designed by a consultant. Sign and intersection striping projects are designed by LHTAC and bid as a purchase and delivery contract for local forces to install.

Measure (ITD & LHTAC)

A great deal of effort and resources are invested in HSIP projects. One of the fundamental reasons ITD is moving towards a standard consistent approach to identify projects is so the long term effectiveness can be evaluated. ITD is very interested in having the projected reduction of fatalities and serious injuries realized. Any inconsistency between reductions and projections can then be addressed in a systematic manner going forward.

Identify Corridor (ITD & LHTAC)

Since each project is associated with a specific corridor it is important to maintain this contextual relationship. The measurement is applied to the specific project, as well as to the overall reduction of fatalities and serious injuries within the corridor.

Review Project Charter (ITD & LHTAC)

The project charter is the baseline for the measure process. The charter contains the Project Objectives Statement of purpose and the original scope of work, which includes times lines, costs, and other resources. There are two basic areas that must be measured. One is whether the project was completed with the resources proposed and the other is how effective were the safety results based upon the actual resources consumed to complete the project.

Calculate Proposed vs. Actual Costs (ITD & LHTAC)

The charter contains the original costs proposed for the given project. However, in order to measure the effectiveness of the project the actual cost necessary to complete the project is necessary to calculate an accurate benefit/cost ratio. This is also important to create a consistent data set to measure the difference proposed cost and actual cost composed across ITD projects.

Review Crash Data (ITD & LHTAC)

Using the project charter as a guide the subsequent crash data that corresponds with the original crash data is collected. The subsequent crash data is used as input for the same calculations when evaluating the original projects.

Compare Pre-Project with Current Data (ITD & LHTAC)

The comparison between the pre-project data and current data is the basis on measuring the effectiveness of the original project

Report Changes in Corridor Health (ITD & LHTAC)

The information collected from the measurement process is presented in a format that communicates the number of fatalities and serious injuries during the measurement period. The report includes the original proposed reductions of fatalities and serious injuries along with the actual costs to complete the project. The report also includes a conclusion section that communicates the measurable changes within the corridor since the project was completed, as well as the difference between the projected reduction of fatalities and serious injuries.

HSIP Report (ITD)

The information contained in the reviewed and validated corridor report is used, along with other relevant information, to create a formal HSIP report for delivery to the FHWA.

FHWA Review Report

The FHWA reviews the HSIP report. If there are questions or issues with the final HSIP report, the FHWA will request any necessary clarifications or modifications.

This document reflects the current process and will be updated as the program develops.

Project Selection Refinement (ITD & LHTAC)

The measures for success or failure of a project will help determine whether counter-measures are effective. This will aid refining the criteria for project selection.

LHTAC
Crash data is analyzed annually and used in LHTAC's current LHSIP application qualification determination. LHTAC's current practice is to encourage Local Highway Juristictions to submit LHSIP applications for simple, easily implemented, systemic projects with high value crash modification factors. Local roadways that have had a recognized countermeasure implemented, using LHSIP funding, are not eligible to receive funding for the next two years, if applying to mitigate the same qualifying

crashes. If after the two years the intended improvements are not realized, a different countermeasure can/will be considered.

ITD

Currently, Idaho performs a straight before-and-after analysis to assess project results. However, ITD is exploring methods of evaluation and purchasing a software program with the capability of running an Empirical Bayes statistical analysis of HSIP projects. This software will be able to include a list of project types that showed improvements so that others can use this information in developing future projects.

Resources

AASHTO Policy on Geometric Design of Highways and Streets

B/C Worksheet

BOARD POLICY 4031

District Corridor Plans

FHWA CMF Clearinghouse

FHWA Toolbox of Countermeasures and Briefs

      Roadway Departure Crashes

      Traffic Signals

      Intersection Crashes

GIS

HAL

Highway Safety Improvement Program (HSIP) Standard Planning Process

Highway Safety Manual

HSCA Guidebook

HSCA Map

HSIP Project Justification Guide

Human Factors Guidelines

IPLAN

ITD Form 1150 – Project Cost Summary Sheet

ITD Form 2435 – Local Federal Aid Project Request

ITD Video Logs

LHTAC Safety Webpage

Local Highway Safety Improvement Program Application

OTIS

Road Safety Audit

FHWA's Railroad-Highway Grade Crossing Handbook

Project Charter Guidebook

Project Scheduling System (PSS)

SI Program Update

Strategic Highway Safety Plan (SHSP)

Traffic Records Coordinating Committee (TRCC) Strategic Plan

Transportation System Asset Management System (TAMS)

WebCARS

Appendix A: HSIP Justification Guide Summary

The HSIP justification guide can be obtained from ITD, and contains guidelines for ITD staff and project managers when forming Highway Safety Improvement Projects (HSIP).

The guide contains the requirements that must be met to gain FHWA approval. In particular, it contains detailed Project Charter requirements, as well as a summary of the HSIP Review Process.